

Claims

- [c1] 1. An anti-friction and anti-wear liquid coating composition for use with parts made of materials that have softening points below about 300 ° F, the coating composition comprising:
a mixture of (i) solid lubricants comprising boron nitride, graphite and molybdenum disulfide, (ii) a thermoset resin system, (iii) at least one catalyst for curing the resin system and (iv) a solvent system comprising highly volatile solvents.
- [c2] 2. The coating composition of claim 1 wherein the solid lubricants comprise about 12–35 weight percent of the total weight of the coating composition and the solvent system comprises about 35–75 weight percent of the total weight of the coating composition.
- [c3] 3. The coating composition of claim 2 wherein the solvent system has a boiling point below about 150 ° F.
- [c4] 4. The coating composition of claim 3 wherein the solvent system consists of solvents selected from the group consisting of methyl ethyl ketone, 2-propoxy ethanol, xylene and diacetone alcohol.
- [c5] 5. The coating composition of claim 4 wherein the resin comprises an epoxy resin.
- [c6] 6. The coating composition of claim 1 wherein the coating composition comprises (in weight % of the composition) about 5–14% graphite, about 6–17% MoS₂, and about 2–5% BN, an epoxy resin in an amount of 16–25%, a vinyl butyral resin, present in an amount of about 0.1–0.4%, a tertiary amine catalyst present in an amount of about 0.1–0.5%, a dicyandimide cross-linking agent present in an amount of about 1–3%, diacetone alcohol present in an amount of about 4–12%, methyl ethylene ketone present in an amount of about 10–30%, 2-propoxy ethanol present in an amount of about 8–20%, and xylene present in an amount of about 6–18%.
- [c7] 7. The coating composition of claim 1 wherein the coating composition has a viscosity of between about 5 to 75 centipoise at 25 ° C and comprises (in weight

% of the composition) about 8.1% graphite, about 10.1% MoS_2 , about 3% BN, about 22.25% epoxy resin, about 0.15% vinyl butyral resin, about 0.3% tertiary amine catalyst, about 1.3% dicyandiamide cross-linking agent, about 8.3% diacetone alcohol, about 20.4% methyl ethylene ketone, about 14.5% 2-propoxy ethanol, and about 11.6% xylene.

- [c8] 8. A method of coating parts made from of low softening point materials, the method comprising:
coating at least a portion of the part with an anti-friction and anti-wear hard coating composition that comprises a mixture of (i) solid lubricants comprising boron nitride, graphite and molybdenum disulfide, (ii) a thermoset resin system, (iii) at least one catalyst for curing the resin system, and a (iv) solvent system comprising highly volatile solvents; and
curing the coating composition to form a coating on the part.
- [c9] 9. The method of claim 8 wherein the solid lubricants comprise about 12-35 weight percent of the total weight of the coating composition and the solvent system comprises about 35-75 weight percent of the total weight of the coating composition.
- [c10] 10. The method of claim 9 wherein the solvent system has a boiling point below about 150 ° F.
- [c11] 11. The method of claim 10 wherein the solvent system consists of solvents selected from the group consisting of methyl ethyl ketone, 2-propoxy ethanol, xylene and diacetone alcohol.
- [c12] 12. The method of claim 11 wherein the resin comprises an epoxy resin.
- [c13] 13. The method of claim 8 wherein the coating composition comprises (in weight % of the composition) about 5-14% graphite, about 6-17% MoS_2 , and about 2-5% BN, an epoxy resin in an amount of 16-25%, a vinyl butyral resin, present in an amount of about 0.1-0.4%, a tertiary amine catalyst present in an amount of about 0.1-0.5%, a dicyandimide cross-linking agent present in an amount of about 1-3%, diacetone alcohol present in an amount of about 4-12%, methyl ethylene ketone present in an amount of about 10-30%, 2-propoxy

ethanol present in an amount of about 8-20%, and xylene present in an amount of about 6-18%.

- [c14] 14. The method of claim 8 wherein the coating composition comprises (in weight % of the composition) about 8.1% graphite, about 10.1% MoS_2 , about 3% BN, about 22.25% epoxy resin, about 0.15% vinyl butyral resin, about 0.3% tertiary amine catalyst, about 1.3% dicyandiamide cross-linking agent, about 8.3% diacetone alcohol, about 20.4% methyl ethylene ketone, about 14.5% 2-propoxy ethanol, and about 11.6% xylene.
- [c15] 15. The method of claim 14 wherein the part has a softening point below about 300 ° F.
- [c16] 16. The method of claim 15 wherein the part comprises HDPE.
- [c17] 17. An article coated with the coating composition of claim 1 wherein the article is made of a material that has a softening point below about 300 ° F.
- [c18] 18. The article of claim 17 wherein the material is made of a substantial amount of HDPE.
- [c19] 19. The article of claim 17 wherein the article is made of a substantial amount of elastomer.
- [c20] 20. The article of claim 17 wherein the highly volatile solvents have an evaporation/boiling point below about 150 ° F.